Philosophy and Social Action 14 (1) 1988

Information Flow in Agriculture: The Major Interest Groups and their Interactions

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Our object is to look for generalities concerning the ways in which information flow is biased by *vested interests*, diffrent individuals or organisations seeking to maximise power, profits and prestige at the expense of others. This first paper deals with six major interest groups which influence the diffusion of knowledge concerning agricultural affairs. A few short case histories are included; because of the limitations on space, we have favoured case histories which illustrate a variety of important problems, especially subjects which rarely receive critical comment. Indeed, that is perhaps the most important problem various vested interests control published comment on agricultural matters to such an extent that analyses which are critical of those vested interests very rarely appear in print (and, when they do get published, it is often in journals or books which are limited in their distribution). The second and third papers use two very different collections of case histories to illustrate the multiplicity of levels of suppression; the case history collections being chosen to provide balance among First, Second and Third World agricultural problems, as well as balance among problems of the recent past, the present, and the immediate future.

Starting with the domestication of plants and animals, agriculture played the predominant role in the rise of civilisations and in trade between people, tribes and nations. Agriculture is the applied science *par excellence*, not only vital for human survival but with ramifications throughout the last few thousand years of human history and culture.

As population pressures required more productivity from the land, agriculture became increasingly diversified. Yield increases required *information*, whether it was the flow of information among farmers, choosing the best crops for particular environments and markets, or the genetic information coded in new varieties of cereals or livestock, genetic information that expressed itself in faster growth rates or better disease resistance.

Despite the overwhelming importance of the subject, there exists to our

knowledge no overall review that examines the major interest groups in modern agriculture and how those interest groups cooperate and compete in biasing the flow of information, i.e., in suppression of alternative viewpoints.[1] There is, however, a rich vein of case histories from which one can attempt an overall synthesis.

One of the best case histories to indicate the nature of agricultural misinformation is that written by Alan Wood.[2] a former 'public relations' officer for the ill-fated Groundnuts Scheme in Africa. This was to be a massive agricultural development project, centred on groundnuts (peanuts) as a cash crop (largely as a source of vegetable oil and seed residue, the latter a cake often used in livestock feed). The Groundnuts Scheme involved Unilever, a British-based multinational, as well as agencies of the governments of Great Britain and the Australian state of Queensland. The failure of the Groundnuts Scheme resulted in the waste of at least £100,000,000 and also caused extensive damage to existing agriculture. The former 'public relations' officer reveals how he became disenchanted with his task as those in charge of the Groundnuts Scheme ignored the warnings from specialists knowledgable of the problems of tropical agriculture. Finally, he reveals how the authorities in the government used *disinformation*, deliberately falsified information, in an attempt to cover-up for the succession of blunders.

Not every case is as clear-cut as the Groundnuts Scheme. Opinions vary greatly as to success or failure, to good versus bad information, on the Green Revolution, in part because of different experiences at different times in different countries with different crops.

Before discussing each of the major interest groups, it is important to keep in mind certain of the changes which have occurred, largely in the last fifty years. In response to agricultural diversification many new small specialist firms were formed. However, there has also been a countervailing trend evident in the creation of large monopolies, including the merging of the multitude of specialist enterprises into large integrated systems. As an example of vertical integration, a single company may control much of the breeding, raising, and slaughtering of pigs, followed by the processing and distribution of pig meat and other porcine parts: "everything utilised except the squeal." Besides such vertical integration based on one or a few species of livestock, there has also been a parallel trend to monopolies based on particular scientific specialities, e g., national or transnational firms controlling the production of hybrid seed and also hybrid strains of livestock. This merging of breeding firms and related enterprises is centred on the science of genetics but includes also some intersection with other disciplines such as nutrition, biochemistry, reproductive physiology, and animal behaviour.

Fission from the requirement of niche specialisation, versus fusion from takeovers and mergers based on various types of integration, are two contradictory trends which mean that, inevitably, the following discussion of six

major interest groups is an oversimplification. Furthermore, although some of the same trends are evident in agricultural development in both capitalist and socialist countries, there are also some important differences, and these differences are not just the obviovs one: the difference in the relative role of the state.

1. Breeding Firms

Breeders supply seed or livestock. In the latter case the firm sells stud animals, or, with the development of the technology of artificial insemination (largely over the last fifty years), semen.

More recently some animal breeding firms have spread their technological expertise to include embryo transfer and other types of 'reproductive engineering.' Certain major plant and animal breeding companies are investing heavily in 'genetic engineering.' These more recent developments illustrate the role of state organisations, even in First World (capitalist) countries: most of the research effort is subsidised by the taxpayer, for most of the research and even much of the development involved in both reproductive engineering and genetic engineering takes place in publicly funded universities and in state agricultural research organisations. This is partly a continuation of the nineteenth and early twentieth century practices where much plant and animal breeding in the U.S.A. took place in government operated research institutes and on university campuses—although many important developments were made by private plant and animal breeders.

At present major areas of controversy, balancing public versus private interest, include the plant varietal rights legislation and the patenting of life forms modified by genetic engineering—examples of how the legal system is used to effect further monopolisation.[3] This will be the focus for future conflict : First World breeding firms are using genetic material which in many instances was originally developed by unknown domesticators and breeders in Third World countries. In 1984 almost two-thirds of the wheat was based on strains which include in their genetic composition the dwarfing genes originally discovered in Asia.[4] Thanks to plant varietal rights legislation, developing countries will have to pay even more for what was originally their own genetic material.

In addition, there is another problem: the very success of certain genetic strains means the loss of genetic diversity. Changes in diseases, pests or market requirements demand new genetic material. The lack of interest in rare breeds and varieties (until very recantly) has meant that much valuable genetic information has already been lost.

2. Chemical Companies

The supplementation of natural fertilisers with other sources of nitrogen, other bulk elements, minor elements and trace elements is quite an old process. So too is the use of a few chemicals against pests. However, most of the chemicalisation of agriculture, notably the widespread usage of synthe-

tic pesticides and herbicides, is a post-World War II phenomenon. At present a small number of First World-based transnationals supply much of the First and Third World's fertilisers, pesticides, herbicides and drugs.

Additional requirements for chemicals have come as a result of the intensification of livestock production. First, there are growth stimulants, which are often synthetic hormones or hormone analogues. (The most recent developments include drugs which suppress fat synthesis and increase protein synthesis: repartitioning agents.) Second, there are antibiotics. Some of these give a modest increase in growth rate (probably by virtue of shifting the species composition of the gut bacteria, or by compensating for adverse effects from poor animal husbandry). Increasingly, antibiotics have become necessary to combat the variety of infectious diseases whose spread is facilitated by the stress which accompanies intensive husbandry ('factory farming') of livestock. Besides infectious diseases caused by microorganisms, there are also problems arising from internal parasites (usually roundworms or tapeworms, against which vermicides or antihelminthics are used), and from external parasites (mainly an assortment of mites, ticks and other arthropods, against which are used many of the same pesticides as are used against insects which are vectors of human diseases or are crop pests).

Chemicalisation of agriculture has generated a number of highly controversial issues, with the chemical companies (and subservient government departments, i.e , 'captured bureaucracies') being powerful vested interests (reviewed more fully in the second paper). Much of the controversy rests on two separate issues :

First, what is *the risk to non-target organisms* (including humans) ? There are questions of acute toxicity versus chronic toxicity ; the latter, the result of the gradual accumulation of low doses being difficult to prove with certainty because there is often a long lag time between cause and effect. Further complications include the possibilities of food chain accumulation (a form of 'bioconcentration'; a consequence of relatively low rates of degradation combined with a high affinity for certain biological depots).

Second, what is *the efficacy of the chemical treatment*, especially in comparison with alternative methods of pest or disease control ? Does the cost of chemical control pay for itself in increased production ? It is here that information flow becomes subjected to a variety of pressures. There are several different paradigms of pest control and eradication. Rarely is the *economic* analysis even reasonably complete.

3. Mechanisation Monopolies

The most conspicuous difference between First and Third World agriculture is the relative importance of large manufacturing firms in the former. Power for First World agriculture comes almost entirely from fossil fuels rather than the muscles of the draught ox and horse. Increasingly, in Third World countries mechanisation now plays an important role.

Thus, mechanisation has, if to varying extents, spread into almost every

facet of agriculture, from irrigattion pumps to combine harvesters. Most of the emphasis is on increased productivity through saving labour costs. Computerisation and automation are only the most recent innovations in the mechanisation trend, with heavy investments being made now in the research and development needed for automated abbatoirs and robot sheep-shearing.

Few will argue against the value of mechanisation in increasing agricultural output per labour unit. But, few will also examine the social costs that arise from the rapid displacement of labour by agricultural (or other) mechanisation and automation.

It is disturbing that there are so few studies directed at the real versus imaginary increases in efficiency from inappropriate mechanisation even in First World countries. One Australian report by an independent agricultural economist claimed that "machinery overload" is a serious problem, causing about a 50% decline in the average rate of return for capital invested per hectare.[5]

For Third World countries the situation has become especially critical. Replacement of draught animals by tractors often means increased dependence on imported sources of energy and mechanical expertise. it is difficult to maintain a reasonable balance between the utilisation of draught animals and mechanisation because the latter becomes a prestige factor, encouraging other farmers to adopt the new technologies, even when they bring unanticipated difficulties. Thus, some agriculture advisors with first hand experience of Third World agriculture urge that draught oxen still have an important role and are not subject to the problems of maintenance and repair in a difficult environment.[6]

Perhaps the best example of First World bias in information flow concerning Third World agriculture is that provided by the Ford Foundation in dismissing India's sacred cows as "useless."[7] Although the Ford Foundation's opinion became important in the American government's attitude toward foreign aid to India, it remained for an American anthropologist, Marvin Harris, to point out a few simple facts of life: the sacred cows produce the bullocks that are a major source of power in Indian agriculture, power for ploughing, power for milling grain, and power for transporting agricultural products. Farmers have few energy costs because the cows and bullocks largely feed on crop stubble and roadside grazing. Cattle dung is important both as a fuel and fertiliser.

The critical point, however, is that the Ford Foundation is a vested interest. The Ford Foundation obtained its large founding grant from the profits of the Ford Motor Company. Given the role of the motor vehicle as the "sacred cow" of American culture, it is not too surprising that the Ford Foundation's experts were indifferent to, if not ignorant of, the roles of various bovine animals in Indian agriculture. As a vested interest favouring mechanisation and opposed to competition from draught animals, Ford's position is obvious.

What is especially damaging about the Ford Foundation's error is that

it prevents a critical analysis of the role of draught bovines, together with suggestions for improvement. For example, Indian favouritism for 'sacred cows" means that inadequate attention is given to the water buffalo, although this species is the major plough beast in the wetter parts of India and is also the major source of milk and ghee.[8]

4. Financial Institutions

The very nature of many types of agricultural production means that outputs (which the farmer can sell) often come long after many of the inputs must be paid for. This has facilitated the emergence of a variety of systems of indebtedness, to pay for the inputs while waiting to reap the benefits from the harvest. The costs of chemicalisation and mechanisation often greatly exacerbate indebtedness.

The borrowing of money to finance agriculture runs the gamut of scale. At the most micro level there is the individual farmer, who may be confronted with usurious interest rates charged by the village moneylender. (Or, even worse, there are the sharecroppers who must repay loans with most of their harvest.) At the most macro level there are the multimillion dollar development projects financed by government borrowing, often from consortia of banking and investment companies, or special international financial institutions, e.g., the World Bank.

The problems arising from borrowed money in agriculture have been a major theme for many writers, usually novelists or economists. However, there is an almost total lack of an appreciation of the problems of rural indebtedness in the environmental literature. A welcome exception to that statement is the series of articles which appeared in 1985 and 1986 in *The Ecologist*. articles dealing with the role of the World Bank and various government agencies in financing the Indonesian transmigration programme and the Amazon basin development.[9]

In some countries financial institutions exert considerable influence over information flow, including even the specific direction of agricultural research. In Australia the only major non-governmental organization financing agricultural research is the Rural Credits Bank. Such financial institutions do not favour critical research. That may well account for the fact that the financial crisis on Australian farms was almost totally ignored by academic researchers specialising in rural problems. Banks, the government and academics all combined to favour increased borrowing to finance farm take overs and a not inconsiderable amount of "machinery overload." There was even a motto: "Get big or get out"—and the only signs of dissent were a few journalists.[10] Taxation policies are often a major encouragement for indebtedness in First World agriculture. Distortion of information flow has become especially evident in recent press releases from the Australian Bureau of Agricultural Economics, which has attempted to play down the rural crisis, although actually admitting that 25% of all specialist wheat producers are now carrying debt burdens of $ 185,000 or more per property and that

many of these farms will fail unless there is some improvement in world commodity prices for wheat.[11]

5. Marketing Boards and Companies

Selling, storing, and transporting agricultural outputs has become the province of a variety of specialist companies, farmers cooperatives, and government organisations. The first mentioned category have largely become taken over by giant conglomerates which deal not only in agricultural outputs but also agricultural inputs, land, and often quite diverse enterprises having little or no direct relation to agriculture. The second and third categories are often termed *marketing boards*, although their functions are much more diverse than the usual definition of marketing (finding the right product for the right market),

Many of the state agricultural agencies in First and Third World countries are QANGOs (=Quasi-Autonomous National Government Organisations). These statutory bodies live in a limbo between public and private enterprise. The agricultural qangos usually deal with one or a few species of crop plant or livestock, or even a single product: Egg Board, Pig Industry Development Authority, Wool Corporation, Potato Board, Meat and Livestock Commission etc.

The marketing boards and companies, together with affiliated transport, storage and inspection agencies, have been almost completely neglected in critical scholarship. Yet, the marketing boards and companies have become a potent force on the agricultural scene. These bodies set the prices paid to the farmer. Governments usually attempt to keep food prices low—sometimes unrealistically low, thereby facilitating the drift from the land and urban dominance. The qangos have considerable legal powers invested in their statutory organisation, as well as are often less accountable for abuse of power than other public or private institutions.

In the course of our own research (on biochemical and population genetics of farm animals) we have met many members of the rural community who have, quite spontaneously, told us about their difficulties with marketing boards and other state-run instrumentalities. One short case history will exemplify this *bureaucratic terrorism*. An enterprising dairy farmer attempted to specialise by providing shops and customers with fresh milk from Jersey cows, This breed is well known for its high quality butter-fat and protein-rich milk). Local milk marketing companies, combined with the Department of Agriculture, apparently did not like the competition. The legal procedure was to force the enterprising dairy farmer to make many expensive alterations supposedly on grounds of public health. The irony is that, after forcing the farmer out of business, his place was taken over and used as a semi-intensive piggery—a far more significant public health problem but one that does not pose a challenge to agribusiness.

The lack of accountability of marketing boards and companies has had grievous consequences for Australian agriculture. In the 1980s a series of

scandals have been revealed in the popular media; unfortunately, most of the journalists involved in these exposes did not know enough background agricultural information. Accordingly, the public was not informed of the full ramifications.

The Australian Dairy Corporation lost milk sales in Indonesia (and elsewhere) through its profligate use of commissions to friends, commissions paid at three times the normally accepted rate.[12] Against the Victorian Dairy Corporation the allegations have included outright corruption and gross misconduct.[13]

Both the New South Wales Grain Handling Authority and the Australian Wheatgrowers Federation (which then changed its name to the Grains Council of Australia) were involved in an estimated $ 100,000,000 loss involving transport failures, poor storage practices, and 'sweetheart' pricing deals.[14] Overpricing and inefficiency have also been shown for the Victorian Grain Elevators Board in one of the very few academic studies of the practices of agricultural qangos.[15]

Especially damaging have been product substitulion cases. For example, the New South Wales Grain Handling Authority was held responsible for inadequate supervision which allowed prime quality wheat to be diluted with inferior grain.[16] Secret correspondence was leaked which revealed that the Australian Wool Corporation had received some 2,900 separate complaints about contaminants in wool bales, ranging from rank pieces of dead sheep to pornographic magazines.[17] (Such material can ruin expensive automated machinery involved in processing wool).

The greatest national (and international) notoriety, however, has been taken by a series of meat substitution scandals, which have lost at least $A 1,000,000,000 in export sales—not to mention a marked decline in the consumption of beef within Australia (as customers suspect, sometimes rightly, that their meat pies and beefburgers are adulterated with kangaroo, horse, donkey, goat and rabbit). Meat substitution is not just a matter of gourmet tastes, as some apologists for the series of scandals have claimed; substitution with Australian possum meat can be a source of toxoplasmosis in man, a disease which causes brain damage and blindness in some people.[18]

The meat substitution scandals have been a series of affairs, some independent of each other, some involving the same parties—with the federal Meat Inspection Division (within the Ministry of Primary Industry) having been revealed as having a singularly unsavoury role.[19] After a Royal Commission, a spokesman for the federal government's Department of Primary Industry actually admitted that the Meat Inspection Division was "inefficient, costly, poorly managed, over-staffed and in some respects corrupt."[20]

The Royal Commission into the Australian Meat Industry was presided over by Justice A.E. Woodward. The Royal Commission produced evidence of extensive malpractice: ".. forgery was widespread.... One of the most serious and disturbing matters to emerge from the Royal Commission's inquiries has been the level of corruption and abuse of power among govern-

ment officials".[21] Yet, after the Royal Commission the government dropped all the criminal charges; corrupt public servants were not even sacked, although some disciplinary measures were taken against 19 meat inspectors.

An interesting aspect of suppression emerges from carefully checking the opinions given by politicians on different occasions. Bert Kelly is a former member of the Federal Parliament who writes many articles in the Packer and Murdoch press (and also in the Adelaide Stock Journal), often using the pseudonym "Modest Farmer". Bert Kelly's opinions are those of big agribusiness, advocacy of low tariffs, and strong opposition against trade unions. In a number of ways Bert Kelly can be considered a founding father of Australia's New Right.

In a newspaper column Bert Kelly strongly protests "the bribery and corruption rife in meat inspection."[22]

A somewhat different attitude is revealed in a copy of Bert Kelly's diary records, quoted in the Royal Commission report :

> "I went to Melbourne for the day to present meat report to the Minister (of Primary Industry), Peter Nixon. It was worth it because it gave me the chance to tell him a few of the notes that we could not put in the report, such as the bribery and blackmail which is so prevalent in the meat inspection game.

Now, why couldn't a Member of Parliament, supposedly representing an agricultural constituency, put such serious charges in writing in a government report?

But, a third quotation suggests that Bert Kelly really did not think "the bribery and blackmail" was important. In attempting to minimise the entire meat substitution debacle, Malcolm Fraser, then Prime Minister of Australia, quoted another opinion by Bert Kelly, given in evidence before the Royal Commission and not reported by the media:

> "We were much more interested in the problems of administration and having (meat) inspectors available at the right time and at the right place than we were, at that time, about the bribery and corruption. That was a secondary matter to us. Getting the (administrative) machinery to construct it to work well was our first requirement."

Malcolm Fraser used other tactics to minimise the significance of the malpractice—including suppressing informed parliamentary debate by the simple (if discourteous) tactic of not providing his parliamentary colleagues with copies of the Royal Commission report before it was debated.[23]

However, Malcolm Fraser's incorporation of Bert Kelly's quotation, in full apparent approval, did bring some unanswered questions from Bill Hayden:[24]

> "Does the Prime Minister recall that in fact those findings (of the Royal Commission) related to matters described as bribery, blackmail and abuse of power? In view of that will he explain to the House how he comes to regard bribery, blackmail and abuse of power as trivial matters?"

Unfortunately, none of the politicians, or the journalists describing the meat substitution scandals, knew enough science to question some of the other suppressive manoeuvres. The failure to detect the meat substitution for years was excused as the result of the lack of adequate laboratory techniques.

We were surprised that such an excuse would be offered when suitable laboratory techniques had been available since the 1960s. Thus, we inserted a new 'meat substitution racket' practical in a third year Zoology course (in Comparative Biochemistry and Pollution). After just one day's work, students who were beginners in the use of electrophoresis (a method for separating molecules on the basis of differences in charge, size and other properties) could distinguish mixtures involving combinations of beef, sheep, goat, two species of kangaroo, rabbit and rat. Several Australian research funding agencies, including some handled by qangos in the Department of Primary Industry, as well as the J.S. Davies bequest handled by the Waite Agricultural Research Institute of the University of Adelaide, refused to support such work,[25]

Such suppression protects the incompetent and the corrupt—and it has damaged badly the beef export industry, one of the most enterprising groups in Australia. It is important to realise that the agricultural qangos, whose performance has been found to be so unsatisfactory, are the major source of research grants in Australia so far as agricultural studies are concerned. In addition, most agricultural scientists are either employed in government laboratories answerable to these qangos, or are dependent upon these qangos for research funding even though their salary is paid by educational institutions. Not too surprisingly, few Australian scientists dare dissent in matters of agricultural policy.

"Those that ignore their history are condemned to repeat it": the beef substitution debacle exemplifies well the price paid for suppression. The failure to prosecute the large number of individuals revealed by the Royal Commission in 1982 as indulging in fraud, bribery, blackmail, theft and other types of inappropriate behaviour, combined with the cover-up by promulgating misinformation (or disinformation ?) about the availability of techniques to detect meat substitution, has meant that the malpractice continues—and continues to harm a vital export industry. In 1986 the *National Farmer* revealed that the meat substitution racket still occurred; not only government agencies but also a number of private firms have been involved. In the present extremely competitive agricultural commodity market, the failure of Australian quality control (even though the actual percentage of adulterated products is low) has forced many overseas buyers in the direction of American or 'Common Market' (EEC) exports. The very criminalisation of parts of the Australian Department of Primary Industry and some private firms means that it is possible for foreign vested interests to sabotage Australian exports.

There are a number of agencies which specialise in the flow of information concerning agricultural affairs. Some of these information services are located entirely with in the organisations dealt with in previous sections. Most firms and all government agencies have 'public relations' specialists or 'information officers'; all too often their job is to fool the public.

Other information agencies influencing agriculture are part of separate societal institutions, e.g., media, libraries, and educational organisations. Still other information agencies involved in agriculture are either small independent bodies, or specialist government sections. dealing with data (e.g. Bureau of Agricultural Economics; Commonwealth Bureaux publishing abstracts of journal aritcles, government reports and some popular articles, compiled into regular issues of *Animal Breeding Abstracts, Plant Breeding Abstracts* etc.

Of critical importance are the agricultural research institutes and the universities (with their schools of agriculture), for these information agencies play the key role in the discovery, integration and dissemination of such of the knowledge at the forefront of agricultural research. Higher education plays an additional, and unique, role in that it provides *certification* awarding degrees for many of the professional people employed in agriculture.

Of special significance in the dissemination of knowledge are the *advisory officers* or (*agricultural extension officers)*, for these individuals bridge the gap between theory and application. The advisory officers serve as a two-way bridge, bringing new ideas and techniques from one farmer to another. The advisory officers also are often the first to alert agricultural research institutes about new problems encountered by farmers, e.g. new pests or diseases, production difficulties, changing market requirements etc.

A recent trend in some Western countries has been to downgrade or eliminate agricultural advisory services. The resulting information gap has becn quickly filled by vested interests : notably private firms renaming their sales people as 'advisory officers' and encouraging farmers to buy more pesticides or bigger tractors.

Accordingly, at present there is an urgent need to evolve countervailing public and private groups of professional advisors, specialists in *critical agricultural science*, who can give farmers and breeders *independent* opinions, free from both commercial pressures and bureaucratic mismanagement. All too often government agencies, notably departments of agriculture, become 'captured bureaucracies', for more responsive to the wishes of political ideologues of agribusiness firms than to the problems of farmers and consumers.

The multiplicity of centres for the generation and distribution of agricultural information means that there is some degre of competition and contradiction. In particular, there are conflicts which arises between the values (and self-interests) of companies, governmental bureaucracies, and professional specialists. For example, consider the professional versus practical interests in schools of agriculture. Many staff who are primarily

research motivated will seek appointments in schools of agriculture even though they are neither knowledgable of, nor even interested in, agricultural problems. Their primary career goals are the pursuit of pure research (or at least what they think of as pure research). Schools of agriculture often have far more money for research, as well as close connections with the agricultural quangoes which control most of the additional available research funds. Schools of agriculture often have much lighter teaching loads, thus allowing research motivated staff, or just idle staff, more free time. (At the University of Adelaide the Waite Agricultural Research Institute receives approximately 11% of the total university budget but does only 2-3% of the teaching).

Accordingly, one finds that there are surprising number of staff in some schools of agriculture who have neither practical agricultural experience nor any sympathy with rural problems. Academic snobbery, of course, is nothing new, but it creates special problems in the teaching and research related to applied sciences.

A further problem, which facilitates so much intellectual suppression, is the protege system which plays such an important role in obtaining access to jobs and to research funding. 'Operators' in administrative positions (usually by means of anonymous peer review) can favour friends, or disfavour dissenters. Despite ample evidence of administrative incompetence or dishonesty in a number of cases of intellectual suppression dealing with agricultural or environmental topics, in no single case was erring administrator held accountable within his institutions.[1]

Six major interest groups dominate the flow of information concerning agricultural affairs : breeding firms, chemical companies, mechanisation monopolies, financial institutions, marketing boards and companies, and information services.

Groups and individuals often attempt to maximise their power, prestige and profits. Such pursuit of self-interest requires that information flow to the public be controlled. Adverse criticism are suppressed. Flattering comments are widely distributed. These are the techniques of 'public relations' and are used by vested interests to prevent regulation and other forms of feedback on abuses.

Agribusiness interests effectively lobby politicians to pass legislation which enhances monopolistic dominance, e.g., plant varietal rights. Government regulatory agencies often become 'captured bureaucracies', cutting out competition. Sometimes, as revealed in the case histories of product substitution in Australia, these government agencies are inefficient and corrupt—and the attempt at cover-up to minimise the scandal becomes a further example of suppression.

Further bias in information flow arises from the fact that much agricultural research is funded by qangos (quasi-autonomous national government organisations), which are almost unaccountable for their actions. In addition, agricultural researchers are under pressure from the hierarchical

systems of many academic and scientific organisations, which dislike dissenting scholarship that is percieved as threatening to the reputations of indiuiduals at the top of the hierarchy or threatening to vested interests which are sources of funds and favours. A further complication is academic snobbery that looks down on useful research although is prepared to accept the financial largesse available in many schools of agriculture.

Agricultural advisory (or extension) workers play a vital role in information flow : they bring the findings of agricultural research to the farmer, they bring successful innovations made by one farmer to other farmers, and they communicate new agricultural problems to researchers and to the government. Reduction in the role of extension officers, often a result of government privatisation policies, has meant that private firms have used their salesmen to fill the information vacuum. The result has been that the rural community has spent too much money on inappropriate pesticides and on 'machinery overload'.

The action which is needed now is to create a *critical agricultural science*, where the different biasing forces are examined and evaluated. Agricultural research must be freed from both external meddling by powerful vested interests and internal pressure of careerism. There is a need for truly independent agricultural advisors, who can provide the rural community with a wide rage of information and ideas.

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25. Clyde Manwell and C. M. Ann Baker, 'Politics invades science', *Stock Journal* (Adelaide) 16 September 1982, p. 6. Also See 'Electrophoretic variation of erythrocyte enzymes of domesticated mammals', pp. 367-412 in N.S. Agar and P. G. Board), editors, *Red Blood Cells of Domestic Mammals* (Amsterdam: Elsevier, 1983).

26. Sue Neales, 'Five years on—the meat scandal continues', *National Farmer* 15 May 1986, p. 16.